United States Patent

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[54] **REFUSE VEHICLE WITH COMPACTING AND UNLOADING MEANS**
10 Claims, 4 Drawing Figs.

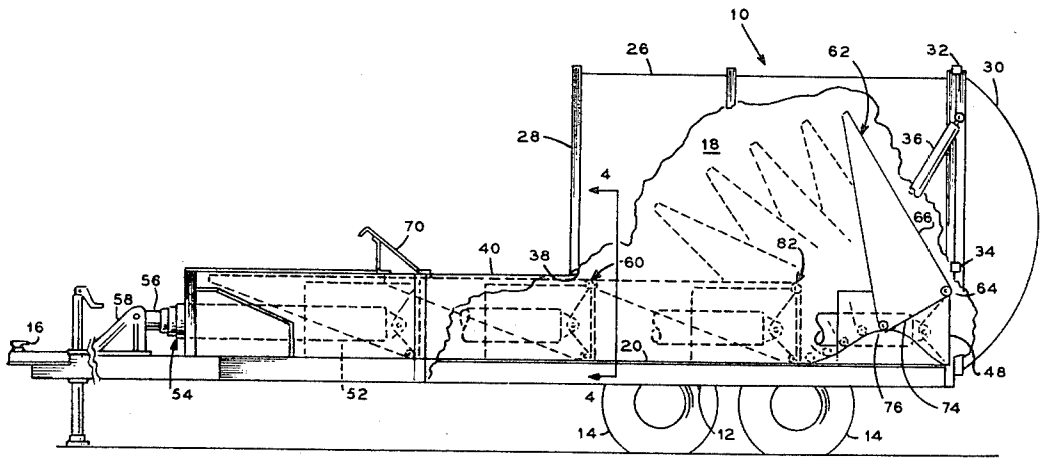
[52] **U.S. Cl.** **214/83.3,** 100/295
[51] **Int. Cl.** **B65f 3/00**
[50] **Field of Search** 214/83.3, 82, 503, 518; 100/295

[56] **References Cited**
UNITED STATES PATENTS

3,419,167	12/1968	Rosaia	214/83.3
3,490,631	1/1970	Smith	214/83.3 X

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ABSTRACT: A refuse vehicle having improved compacting and unloading means is provided. A refuse storage space of the vehicle has a rear unloading door and a front opening through which refuse is loaded into the storage space. A small compacting plunger pushes the refuse through the loading opening into the space and compacts it. A rigid cover member is hinged to the plunger and is pivotally raised when the plunger is extended fully into the storage area and the unloading door is open to enable the plunger and cover member to periodically unload the refuse from the storage space by moving the plunger through a longer stroke through the storage space and to a point near the unloading door. The small plunger enables high compacting pressures to be achieved and yet the combination of the plunger and cover member enables the vehicle to be unloaded without the need for tilting the body.



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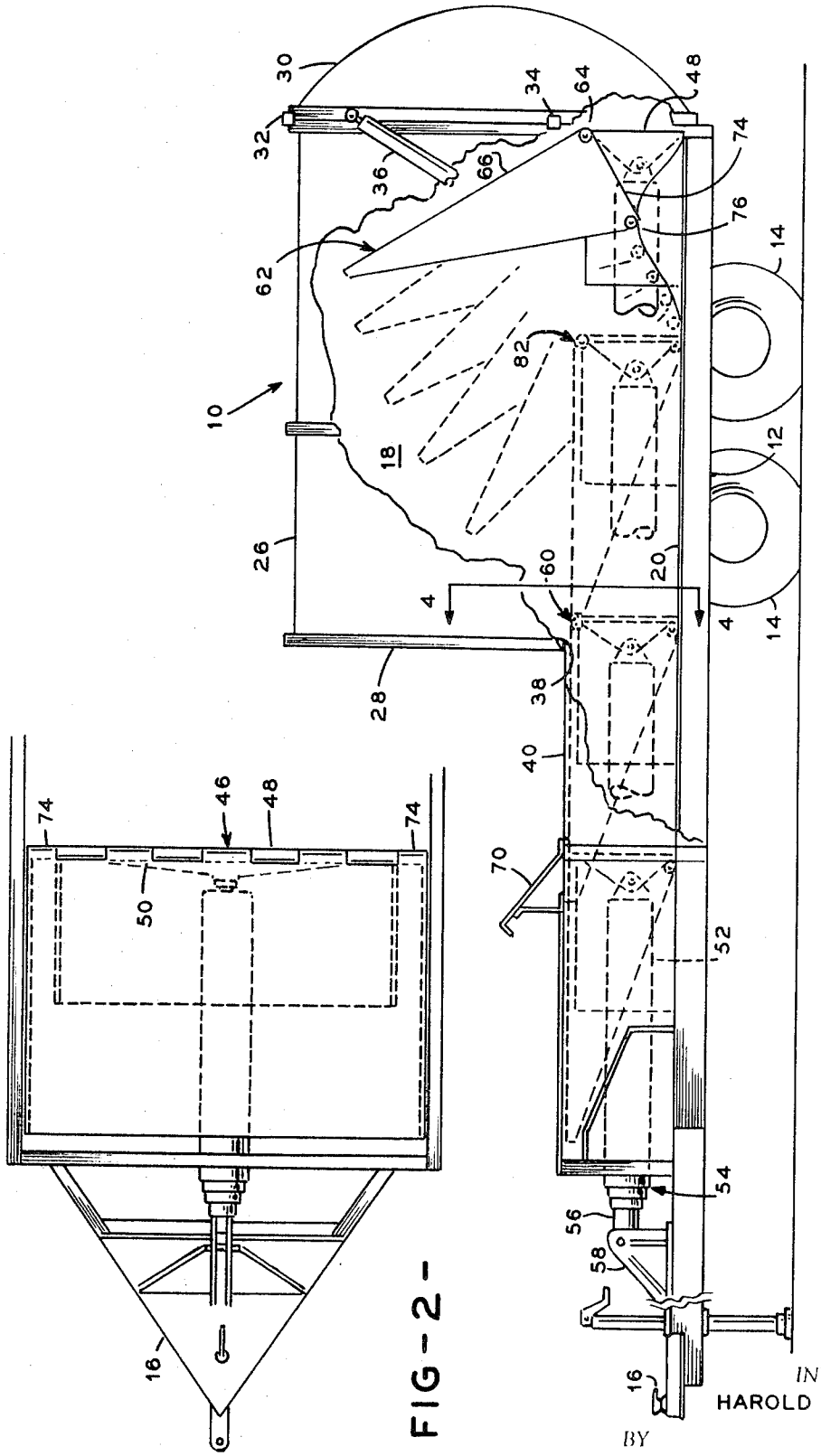


FIG-1-

FIG-2-

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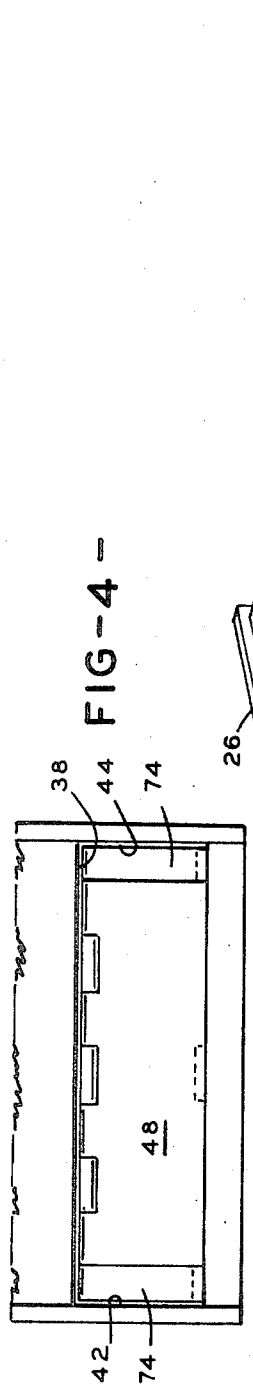


FIG-4-

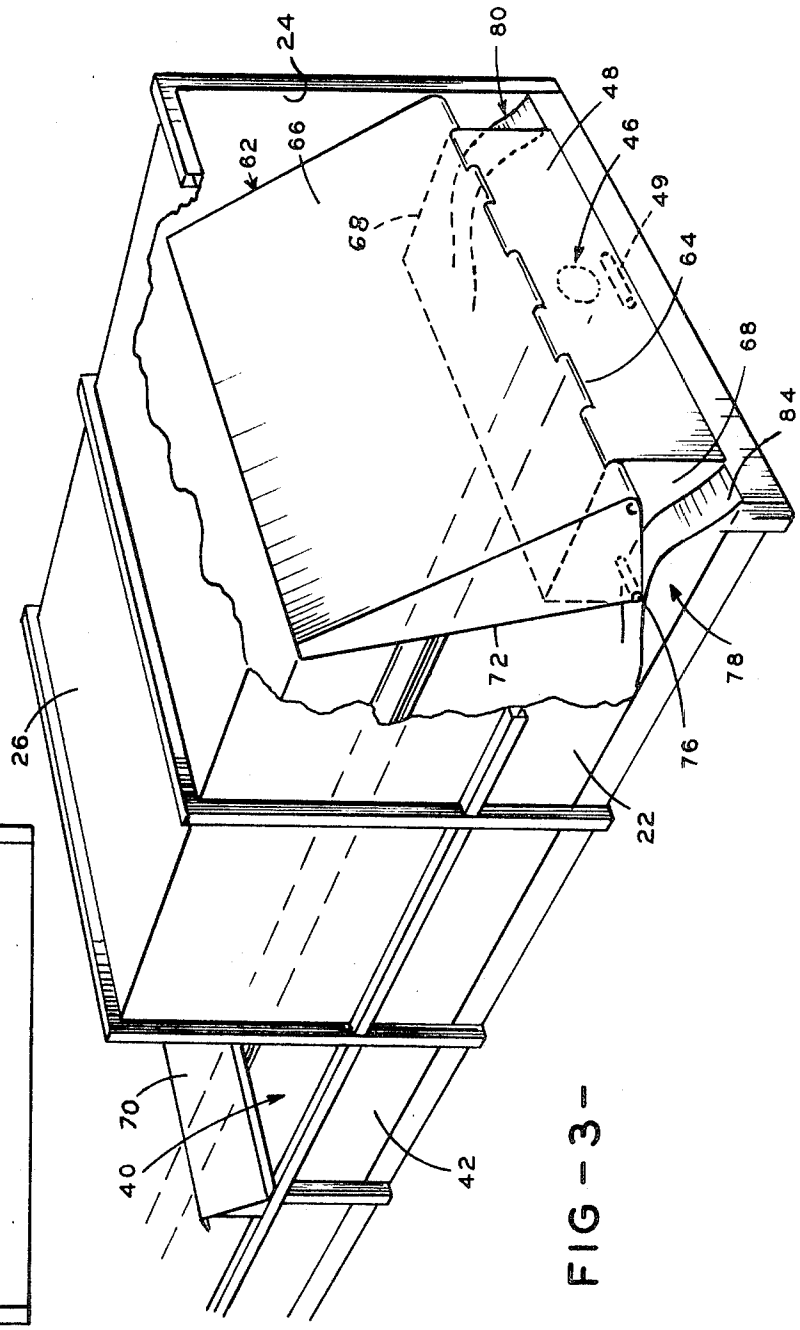


FIG-3-

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REFUSE VEHICLE WITH COMPACTING AND UNLOADING MEANS

This invention relates to a refuse vehicle and more particularly to such a vehicle having improved compacting and unloading means.

A variety of refuse vehicles are now known in the art with these vehicles having a number of types of devices employed therewith to enable compaction or compression of the refuse so that a substantial quantity of refuse can be handled in a relatively small vehicle. In order to unload most refuse vehicles heretofore employed, the storage body was designed to tilt rearwardly with a rear door opened to dispose of the contents similarly to a dump truck. However, the tiltable bodies on refuse vehicles increase rather substantially the cost thereof because of the various additional structure and components required. In other instances, attempts have been made to utilize the same plunger that is used to load the refuse to also unload the refuse by moving the plunger toward the rear of the body to push the refuse out the rear unloading opening. However, for the compacting plunger to effectively unload the refuse, it must be of a substantial size in order to provide enough area to push the refuse out of the storage space. With the larger face area of the compacting plunger, the compacting pressures will be relatively low when any reasonable force is applied to the compacting plunger. Consequently, the refuse is not compacted to the degree possible with smaller plungers with the result that the vehicle must be larger and heavier than otherwise necessary to accommodate a load of a desired size.

The refuse vehicle according to the present invention is capable of achieving both high compacting pressures and effective unloading without the necessity of employing a tiltable body. This is achieved by employing a compacting plunger with a relatively small face area to achieve the high compacting pressures desired to effectively handle an economically sized load in a reasonably small storage space. A rigid cover member is hinged to the small plunger and moves therewith to achieve several purposes. During the compacting or loading reciprocating movement of the plunger, the cover member is horizontal and rides above and behind the plunger to intercept refuse which may be dumped into the loading area adjacent the loading opening of the storage space while the plunger is reciprocating. This prevents refuse being deposited behind the plunger and causing it to jam. When it is desired to unload the storage space, the compacting plunger is moved with an extra long stroke through the loading opening and through the storage space to a point near the rear, unloading opening of the vehicle. When the compacting plunger is wholly within the storage space, the cover member is raised about the hinged connection so that the edge thereof opposite the hinged edge is near the top of the storage space. The face of the compacting plunger and the cover member thereby substantially fill the transverse cross section of the storage space to effectively push and remove all of the refuse therefrom. With this design, both high compacting pressure and effective unloading without a tiltable body are obtained. The prevention of refuse being dumped behind the plunger when reciprocating through its compacting cycle also is simultaneously achieved.

It is, therefore, a principal object of the invention to provide an improved refuse vehicle having combined means for effectively loading, compacting, and unloading refuse.

Numerous other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is a side view in elevation, with parts broken away, of a refuse vehicle embodying the invention;

FIG. 2 is a fragmentary top view of the vehicle of FIG. 1;

FIG. 3 is a somewhat schematic view in perspective of a compacting plunger and cover member embodying the invention, shown in a raised, unloading position; and

FIG. 4 is a view in elevation taken along the line 4–4 of FIG. 1.

Referring to FIG. 1, a refuse vehicle embodying the invention is indicated at 10 and is shown in the form of a trailer which can be towed by means of a pickup truck or the like. The vehicle 10 can be on the same chassis as the truck, but by making the truck and refuse vehicle separate, in the event one is disabled for repairs, the other can still be utilized. The vehicle 10 can be towed from building to building for collecting refuse or it can be parked at one location, such as an apartment house project, for a period of time to receive refuse, after which period the vehicle is towed to a dump and the contents emptied.

The vehicle 10 comprises a chassis 12 with rear wheels 14 and a forward trailer connection 16. A refuse space 18 is formed at the rear by a floor 20, sidewall 22 and 24, a top 26, and a forward wall 28. The rear or unloading opening of the storage space 18 is closed by a closure member or door 30 pivotally supported by the top 26 through a hinge 32 and held closed by a suitable latch 34. The door is opened and closed by a fluid-operated cylinder 36, being opened in a counterclockwise direction, as viewed in FIG. 1.

The forward wall 28 has a loading opening 38 through which refuse is loaded into the space 18. A loading space or bin 40 is formed immediately in front of the opening 38, being defined by the floor 20 and sidewalls 42 and 44. A compacting plunger 46 has a face 48 forming, in effect, a movable front wall of the loading bin 40. A central supporting roller 49 is rotatably mounted at a central, rear portion of the plunger 46 just below the lower edge of the face 48. The roller 49 can be resiliently mounted, if desired, to support a substantial portion of the weight of the plunger 46 and yet enable the lower edge of the face 48 to ride on or close to the floor. A bracket 50 is affixed to the rear of the plunger face 48 for pivotally connecting a cylindrical component 52 of a fluid-operated cylinder 54. The cylinder is a multitelescoping type with a component of smallest diameter 56 pivotally mounted on a front bracket 58. The cylinder 54 is powered by a suitable pump and reservoir (not shown) with the pump operated by a power takeoff of the towing truck. Where the vehicle 10 is to remain stationary for a period of time, the pump can be operated by an electric motor, if desired. The cylinder 54 is controlled either by a manually-operated valve or by suitable electric automatic controls to move the compacting plunger 46 from the retracted position at the forward end of the loading bin 40 to a compacting position near the forward wall 28, as shown in dotted lines indicated at 60. With this arrangement, refuse deposited in the bin 40 will be pushed by the plunger 46 into the space 18 and, as the space fills, the refuse is compacted. Normally, the refuse is moved to the rear of the space 18 and then, due to the arcuate nature of the rear door 30, is forced upwardly so that the refuse moves in a generally reverse C-shaped path, as viewed in FIG. 1.

A cover member 62, in accordance with the invention, is mounted for movement with the compacting plunger 46 and, as shown, has an edge pivotally connected to the upper edge of the compacting face 48 by a piano-type hinge 64. This hinge preferably extends completely across the upper edge of the plunger face 48 with the cover extending beyond both vertical edges of the face 48, as shown in FIGS. 3 and 4. The cover 62 comprises an upper cover plate 66 normally supported in a horizontal plane by side plates 68 which extend rearwardly from the ends of the plunger face 48. With the use of the cover plate 66, when the compacting plunger 46 moves to the compacting position indicated at 60, any refuse then deposited in the bin 40 will simply rest on the cover plate 66 and not fall behind the face 48 to cause eventual jamming. The refuse then deposited on the cover plate 66 will be scraped or pushed off into the bin 40 as the plunger 46 is moved to the retracted position. For this purpose, a slanted loading plate 70 at the forward end of the bin has a depending flange which cooperates with the upper surface of the plate 66 to remove any deposited refuse.

The cover plate 66 has a pair of side plates or braces 72 which are of generally triangular shape and support depending plunger face extensions 74. Rollers 76 are mounted at the

lower edges of the plates 72 and extensions 74 and aid in supporting the plunger 46 during its movement on the floor 20. The compacting face 48 and the extensions 74 constitute a relatively small area compared to the overall size of the compacting space 18. Consequently, a high compacting pressure in terms of pounds per square inch is applied to the refuse when the compacting plunger 46 is moved from the retracted position to the compacting position.

The cover 62 serves a second important function when it is desired to unload the space 18. At this time, the fluid-operated cylinder 54 is extended to move the plunger 48 beyond the compacting position 60 to an unloading position in which the compacting face 48 is near the rear opening of the storage space 18, as shown in solid lines in FIG. 1. During this movement, the side rollers 76 engage side ramps 78 and 80 and cause the cover member 62 to move in a clockwise direction, as viewed in FIGS. 1 and 3. At its extreme raised position, the cover plate 66 is preferably at an angle in the order of 50° or more to the horizontal to provide effective gravitational removal of the refuse thereon. The cover member 62 begins to rise when the compacting plunger is in a position indicated in dotted lines 82. When moving from the position 60 to the position 82, the compacting plunger 46 will move some of the refuse thereabove rearwardly, so that no refuse in the upper portion of the space 18 will tend to fall behind the free edge of the cover plate 66. The side plates 68 and 70 also are effective to prevent refuse from falling behind the compacting face 48 and the side ramps 78 and 80 have rear downwardly slanted edges 84 down which refuse will slide if deposited thereon. The angle of the slanted edges 84 preferably exceeds 50° to the horizontal. If desired, other means, such as a fluid-operated cylinder, can be used to raise the cover member 62.

Various modifications of the above described embodiment of the invention will be apparent to those skilled in the art and it is to be understood that such modifications can be made without departing from the scope of the invention, the embodiment shown and described being primarily for purposes of illustration and not limitation.

I claim:

1. A refuse-collecting vehicle comprising wall means forming a refuse storage space, said wall means also defining a loading opening and an unloading opening, a closure member for said unloading opening, means forming a loading space adjacent said loading opening, a compacting plunger having a compacting face, means for reciprocating said plunger through said loading space between a retracted position in which the plunger face is spaced from said loading opening and a compacting position in which the plunger face is near said loading opening, said reciprocating means also being effective to move said plunger to an unloading position in said storage space with the plunger face near said closure member, a substantially rigid cover member connected with said plunger, said cover member being of a size to substantially cover said loading space behind said plunger face when said plunger face is in the compacting position adjacent said loading opening, and means for raising said cover member within said storage space when said plunger is moved toward the unloading position near said closure member, to enable said cover member to facilitate unloading of the storage space.

2. A vehicle according to claim 1 characterized by said cover member being connected to said plunger by having an edge pivotally attached to said compacting plunger.

3. A vehicle according to claim 2 characterized by said raising means for said cover comprising means forming a ramp within said storage space, and means connected to said cover member engageable with said ramp to pivot said cover member upwardly around the pivotal attachment.

4. A vehicle according to claim 3 characterized by said means for reciprocating said compacting plunger comprising a telescopic, fluid-operated cylinder.

5. A vehicle according to claim 2 characterized by said raising means comprises two ramps positioned at sides of said storage space between the loading opening and the unloading opening, and a pair of plunger face extensions at the ends of the plunger face, said extensions being rigidly affixed to said cover member and engageable with said ramps to pivot said cover member upwardly.

6. A vehicle according to claim 1 characterized by roller means carried by said compacting plunger to facilitate movement of said plunger during reciprocation thereof.

7. A load-carrying vehicle comprising wall means forming a storage space for the load, said wall means further defining loading and unloading openings for the space, a closure member for said unloading opening, means forming a loading space adjacent said loading opening, a compacting plunger having a plunger face, means for reciprocating said plunger through said loading space between a retracted position in which the plunger face is spaced from said loading opening and a compacting position in which the plunger face is near said loading opening, said reciprocating means also being effective to move said plunger to an unloading position in said storage space with the plunger face near said closure member, a rigid cover pivotally connected with said plunger and extending behind said plunger face, and means for pivotally raising said rigid cover within said storage space when said plunger is moved toward said closure member and said plunger and said cover are within said storage space, to enable said plunger and said rigid cover to push any load in said storage space out the unloading opening.

8. A vehicle according to claim 7 characterized by said raising means comprising means forming a ramp adjacent each side of said storage space and extending in the direction of movement of said compacting plunger, said rigid cover having depending means extending downwardly on each side of said plunger face and engageable with said ramps when said compacting plunger is moved toward the unloading position to raise said rigid cover as the plunger moves further toward the unloading position in said storage space.

9. A vehicle according to claim 8 characterized by said depending means forming extensions of said plunger face.

10. A vehicle according to claim 8 characterized by rollers carried by said depending means to engage said slanted surfaces.